CLAIMS

1. An imaging optical system comprising:

a first optical system having a part around its reference axis for converging a light beam emerging from an optional point in a predetermined range on a first conjugate plane and diverging at a divergence angle of 10° or greater; and

a second optical system having a part around its reference axis for diverging the light beam emerging from the first optical system;

wherein an enlarged image similar to an image in a predetermined range on the first conjugate plane is formed on a second conjugate plane; and

distance S1 along the reference axis of the first optical system between the first optical system and the second optical system, distance S2 along the reference axis of the second optical system between the second optical system and the conjugate plane B, distance L1 to a first converging point where distance along the reference axis of the first optical system in all sections of the light beam including principal rays is the longest, distance L2 to a second converging point where distance along the reference axis of the first optical system in a section of the light beam different from the aforesaid section is the shortest, distance L11 relating to a light beam emerging from a position the nearest to the reference axis of the first optical system among the distances L1 to the first converging point, distance L21 relating to a light beam emerging from a position the nearest to the reference axis of the first optical system among the distances L2 to the second converging point, distance L1n relating to a light beam emerging from a position the remotest from the reference axis of the first optical system among the distances L1, distance L2n relating to a light beam emerging from a position the remotest from the reference axis of the first optical system among the distances L2, distance D1 relating to an optional light beam emerging from a predetermined range on the first conjugate plane and along the optional light

beam between the first and the second optical system, and distance D2 along the light beam between the second optical system and the second conjugate plane satisfy conditions expressed by:

$$S1 \leq L11 \leq S1 + S2$$

$$S1 \leq L21 \leq S1 + S2$$

$$L11/L1n < 0.25$$

$$|L21/L2n| < 1.5$$

$$D1 < D2$$

2. The imaging optical system according to claim 1, wherein the imaging optical system meets at least one of the following conditions:

$$S1/L11 > 0.6$$

$$(S1 + S2)/L2n < 1$$

$$\Delta SL > 0.6$$

where S1 is the distance between the first and the second optical system along the reference axis of the first optical axis, S2 is the distance between the second optical system and the second conjugate plane along the reference axis of the second optical system, L11 is the distance relating to a light beam emerging from a part the nearest to the reference axis of the first optical system among the distances L1 to the first converging point in a section of the light beam, L2n is the distance relating to a light beam emerging from a position the remotest from the reference axis of the first optical system among the distances L2 to the second converging point, and ΔSL is the difference between a maximum S1/L1 and a minimum S1/L1 relating to each light beam.

3. The imaging optical system according to claim 1 or 2, wherein the imaging optical system is capable of either an imaging function to form an enlarged image of the first conjugate plane on the second conjugate plane or an imaging function to form a reduced image of the second conjugate plane on the first conjugate plane.

4. The imaging optical system according to claim 3, wherein each of the first and the second optical system includes an optical element having at least one aspherical

surface or a free-form surface.

5. The imaging optical system according to claim 3, wherein the first optical system comprises principally refracting optical elements, and the second optical system comprises principally reflecting optical elements.

6. The imaging optical system according to claim 3, wherein the first and the second optical systems comprise principally reflecting optical elements.

7. The imaging optical system according to claim 3, wherein at least either the first or the second optical system includes an optical element decentered from its reference axis.

8. The imaging optical system according to claim 3, wherein at least either the first or the second optical system includes a rotationally symmetric optical element.

9. The imaging optical system according to claim 3, wherein each of the first and the second optical system includes rotationally symmetric optical elements having a common axis of rotation symmetry, and the reference axes of the first and the second optical system are aligned with the axis of rotation symmetry.

10. The imaging optical system according to claim 3, wherein all the light beams are inclined at angles not smaller than 45° to a normal to the second conjugate plane B.